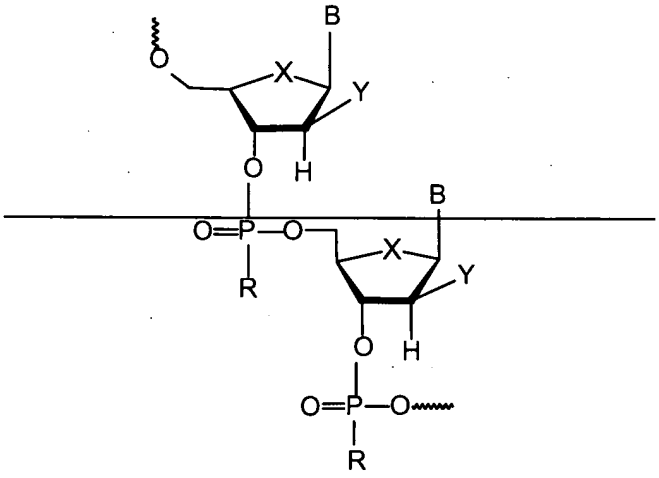
AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (canceled)

Claim 2 (currently amended): A composition to selectively prevent or modulate gene ~~transcription and~~ expression in a sequence-specific manner; which comprises an effective amount of at least one oligonucleotide selected from the group consisting of an oligonucleotide consisting of β-D-arabinose sugars hybridizing to a ~~single stranded~~ complementary RNA to induce RNase H activity[[;]], an oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' position of the sugar rings with halogen, alkyl, alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, or azido and hybridizing to a complementary RNA to induce RNase H activity, and an oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' position of the sugar rings with halogen, alkyl, ~~CH_2F, CF_3, SCH_3,~~ alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, or azido and hybridizing to duplex DNA/DNA or DNA/RNA to form a triple helical complex[~~,~~]; in association with an acceptable carrier[.]~~, wherein said oligonucleotide consisting of β-arabinose sugars substituted at 2' position of the sugar ring has the formula:~~



~~wherein,~~

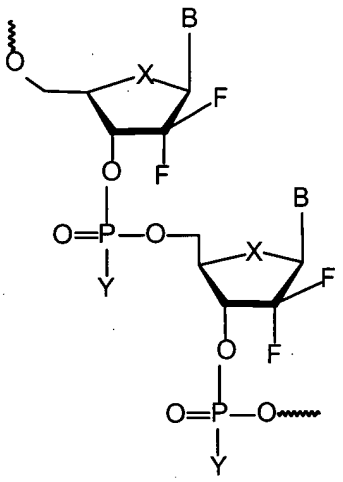
~~B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, and 5-methylcytosine;~~

~~Y at the 2' position of the sugar ring is selected from the group consisting of halogen, alkyl, CH_2F, CF_3, SCH_3, allyl, amino, aryl, alkoxy, and azido;~~

~~R at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and~~

~~X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2).~~

Claim 3 (currently amended): A composition to selectively prevent or modulate gene ~~transcription and~~ expression in a sequence-specific manner; which comprises an effective amount ~~of at least one oligonucleotide selected from the group consisting~~ of an oligonucleotide ~~consisting of~~ β-arabinose sugars hybridizing to ~~a single stranded~~ complementary RNA to induce RNase H activity~~; and an oligonucleotide consisting of β-arabinose sugars substituted at 2' position of the sugar ring with halogen, alkyl, CH_2F, CF_3, SCH_3, allyl, amino, aryl, alkoxy, or azido and~~ or hybridizing to duplex DNA/DNA or DNA/RNA to form a triple helical complex, ~~in association with an acceptable carrier,~~ wherein said oligonucleotide ~~consisting of β-arabinose sugars substituted at 2' position of the sugar ring~~ has the formula:



wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, 5-methylcytosine;

Y at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2)[[.]][;]

in association with an acceptable carrier.

Claim 4 (cancelled):

Claim 5 (currently amended): The composition of any one of claims 2 and 3, [[4]], wherein said complementary RNA is cellular mRNA or viral RNA.

Claim 6 (previously presented): The composition of any one of claims 2 and 3, wherein said acceptable carrier is a pharmaceutically acceptable carrier for administration to a host.

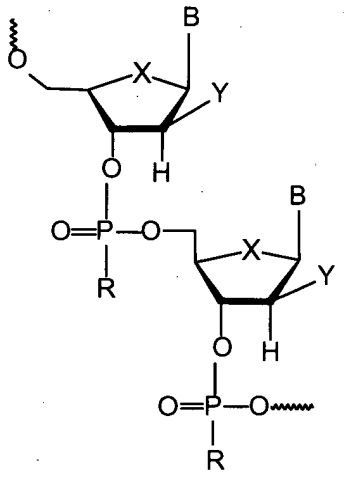
Claims 7 (withdrawn): A method for cleaving single stranded RNA, which comprises the steps of:

a) hybridizing in a sequence specific manner an oligonculeotide consisting essentially of arabinose sugars to a single stranded RNA to induce RNase H activity; and

a) allowing said induced RNase H to cleave said hybridized single stranded RNA.

Claim 8 (withdrawn); A method to inhibit DNA replication and/or DNA transcription, which comprises hybridizing in a sequence specific manner an oligonucleotide consisting essentially of arabinose sugars substituted at the 2' position of the sugar ring with halogen, alkyl, alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, or azido to duplex DNA/DNA or DNA/RNA to form a triple helical complex; thereby inhibiting DNA replication and/or DNA transcription.

Claim 9 (withdrawn): The method of claim 7, wherein said oligonucleotide has the formula:



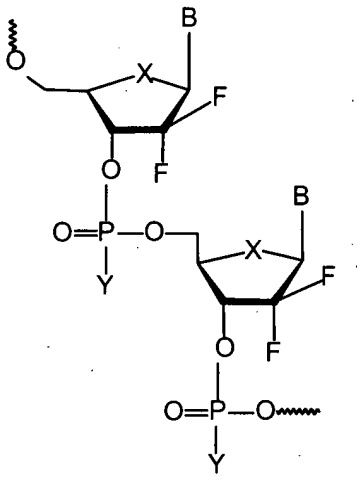
wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, and 5-methylcytosine;

Y at the 2' position of the sugar ring is selected from the group consisting of a halogen (fluorine, chlorine, bromine, iodine), alkyl, alkylhalide (e.g., $-CH_2F$), alkylsulfhydryl ($-SCH_3$), allyl, amino, aryl, alkoxy, and azido;

R at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2).



Claim 10 (withdrawn): The method of claim 7, wherein said oligonucleotide is

wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, 5-methylcytosine;

Y at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2).

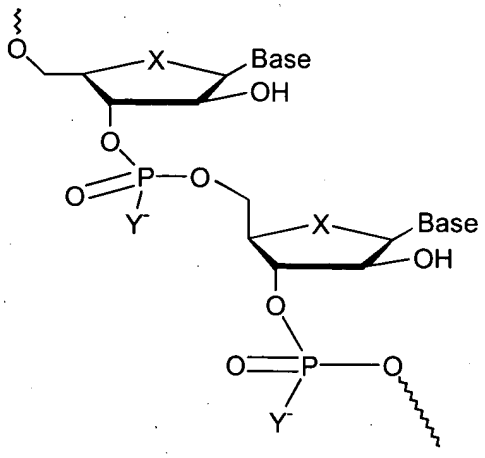
Claim 11 (withdrawn): The method of claim 7 wherein said oligonucleotide is chemically modified at least at one site with a ligand or a pharmaceutical agent to enhance at least one of: (i) permeability of said oligonucleotide into cells,)ii) nuclease stability, or (iii) binding strength of hydribization to complementary sequences.

Claim 12 (withdrawn): The method of claim 11, wherein the ligand is a cell surface receptor, at least one L-sugar residue, a 3'-to-3' linked nucleotide, at least one 2-O-methyl-D-ribose sugar.

Claim 13 (withdrawn): The method of claim 7, wherein said RNA is complementary RNA.

Claim 14 (withdrawn): The method of claim 13, wherein said complementary RNA is cellular mRNA or viral RNA.

Claim 15 (withdrawn): A method for selectively cleaving RNA, which comprise selectively hydridizing an oligonucleotide consisting essentially of B-D-arabinofuranose nucleotide units to RNA without hydridizing to single stranded DNA in a sequence specific manner, said oligonucleotide has the formula:



wherein said oligonucleotide has a mixed base composition;

wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, 5-methylcytosine;

Y at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

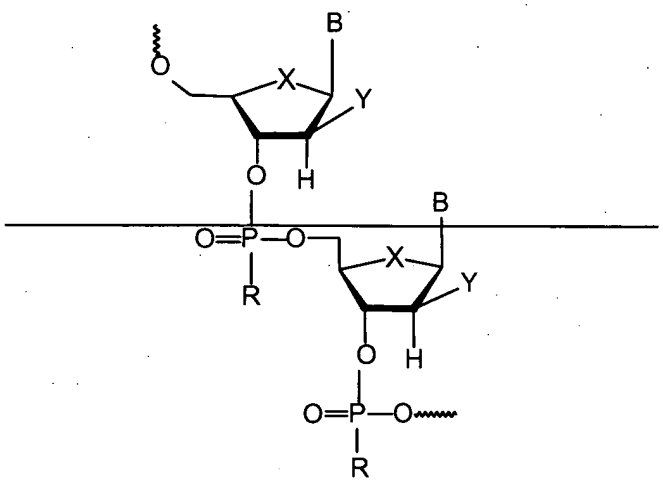
X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2).

Claim 16 (withdrawn): A method of catalyzing chemical reactions carried out by nucleic acid enzymes, which comprises using the composition of claim 2.

Claim 17 (withdrawn): The method of claim 7 wherein said oligonucleotide is a chimera of at least one ANA nucleotide unit and at least one 2'F ANA nucleotide unit to enhance at least one of: (i) permeability of said oligonucleotide into cells,)ii) nuclease stability, or (iii) binding strength of hydribization to complementary sequences.

Claim 18 (canceled)

Claim 19 (currently amended): An oligonucleotide for selectively preventing or modulating gene ~~transcription and~~ expression in a sequence-specific manner in a host; which comprises an oligonucleotide consisting of β-D-arabinose sugars hybridizing to ~~a single stranded~~ complementary RNA to induce RNase H activity[[;]][,] an oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' position of the sugar rings with halogen, alkyl, alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, or azido and hybridizing to a complementary RNA to induce RNase H activity, ~~and~~ or an oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' position of the sugar rings with halogen, alkyl, ~~CH_2F, CF_3, SCH_3,~~ alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, or azido and hybridizing to duplex DNA/DNA or DNA/RNA to form a triple helical complex; and at least one 2-O-methyl-D-ribose sugar at 3', 5' or both terminus of said oligonucleotide[[,]]. ~~wherein said oligonucleotide consisting of β-arabinose sugars substituted at 2' position of the sugar ring has the formula:~~



~~wherein,~~

~~B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, and 5-methylcytosine;~~

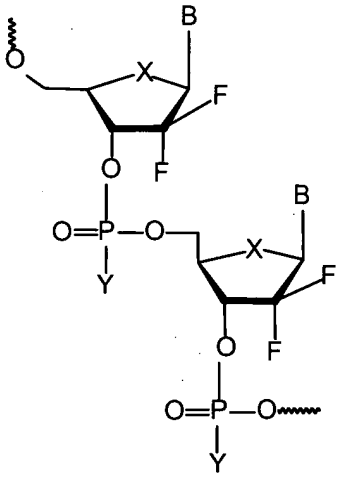
~~Y at the 2' position of the sugar ring is selected from the group consisting of a halogen, alkyl, $-CH_2F$, CF_3, $-SCH_3$, allyl, amino, aryl, alkoxy, and azido;~~

~~R at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and~~

~~X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2).~~

Claim 20 (currently amended): An oligonucleotide for selectively preventing <u>or modulating</u> gene ~~transcription and~~ expression in a sequence-specific manner in a host; which comprises an oligonucleotide ~~consisting of β-arabinose sugars~~ hybridizing to a ~~single stranded~~ <u>complementary</u> RNA to induce RNase H activity~~; and an oligonucleotide consisting of β-arabinose sugars substituted at 2' position of the sugar ring with halogen, alkyl, CH_2F, CF_3, SCH_3, allyl, amino, aryl, alkoxy, or azido and~~ <u>or</u> hybridizing to duplex DNA/DNA or DNA/RNA to form a triple helical complex; ~~and having and at least one 2-O-methyl-D-ribose sugar at 3', 5' or both terminus of said oligonucleotide[,]; wherein said oligonucleotide~~

~~consisting of β-D-arabinose sugars substituted at 2' position of the sugar ring has~~ and consisting of the formula:



wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, 5-methylcytosine;

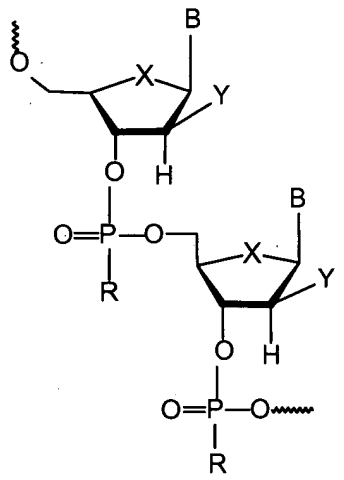
Y at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2)~~-[;]~~

and wherein said oligonucleotide has at least one 2-O-methyl-D-ribose sugar at the 3', 5' or both terminus of said oligonucleotide.

Claims 21-34 (canceled)

Claim 35 (new): A composition comprising an effective amount of an oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' positions of the sugar rings and having the formula:



wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, and 5-methylcytosine;

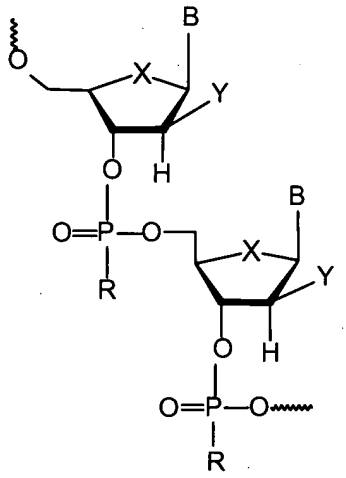
Y at the 2' position of the sugar ring is selected from the group consisting halogen, alkyl, alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, and azido;

R at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2);

in association with an acceptable carrier.

Claim 36 (new): An oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' positions of the sugar rings and having the formula:



wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, and 5-methylcytosine;

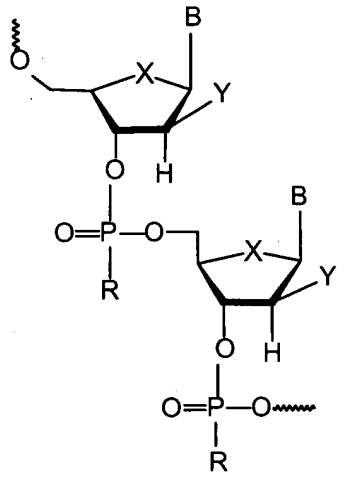
Y at the 2' position of the sugar ring is hydroxy;

R at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2);

and having at least one 2-O-methyl-D-ribose sugar at 3', 5' or both terminus of said oligonucleotide consisting of β-D-arabinose sugars.

Claim 37 (new): An oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' positions of the sugar rings and having the formula:



wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, and 5-methylcytosine;

Y at the 2' position of the sugar ring is selected from the group consisting halogen, alkyl, alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, and azido;

R at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

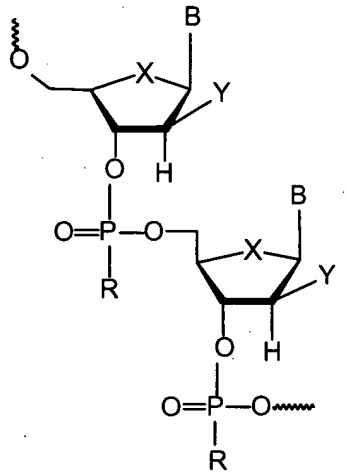
X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2);

and having at least one 2-O-methyl-D-ribose sugar at 3', 5' or both terminus of said oligonucleotide consisting of β-D-arabinose sugars.

Claim 38 (new): A composition of claim 35, wherein said oligonucleotide consists of β-D-arabinose sugars substituted at the 2' position of the sugar rings with fluorine.

Claim 39 (new): An oligonucleotide of claim 37, wherein said oligonucleotide consists of β-D-arabinose sugars substituted at the 2' position of the sugar rings with fluorine.

Claim 40 (new): An oligonucleotide consisting of β-D-arabinose sugars substituted at the 2' position of the sugar rings and having the formula:



wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, and 5-methylcytosine;

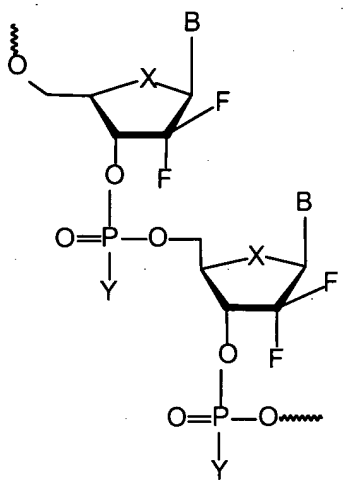
Y at the 2' position of the sugar ring is selected from the group consisting halogen, alkyl, alkylhalide, alkylsulfhydryl, allyl, amino, aryl, alkoxy, and azido;

R at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2).

Claim 41 (new): An oligonucleotide of claim 40, wherein said oligonucleotide consists of β-D-arabinose sugars substituted at the 2' position of the sugar rings with fluorine.

Claim 42 (new): An oligonucleotide having the formula:



wherein,

B is selected from the group consisting of adenine, guanine, uracil, thymine, cytosine, inosine, 5-methylcytosine;

Y at the internucleotide phosphate linkage is selected from the group consisting of oxygen, sulfur, methyl, amino, alkylamino, dialkylamino (the alkyl group having one to about 20 carbon atoms), methoxy, and ethoxy; and

X at the furanose ring (position 4') is selected from the group consisting of oxygen, sulfur, and methylene (CH_2).